Cape. However, a number of species are continuously distributed, suggesting that South-Eastern Mountain Grassland plays an important role as a corridor. Conversely, the comparative isolation of the Sneeuberge was sufficient to allow the development of at least nine local endemics.

The genus *Bracca* Hübner in the Oriental and Australian tropics: Distribution patterns and the phenomenon of strikingly different island-races (Geometridae, Ennominae)

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Species in the genus *Bracca* Hübner [1820] are distributed in the Oriental and Australian tropics; the geographic range extends from the extreme south of Thailand to tropical Australia. 26 species are recorded for the genus (Parsons et al., 1999), the majority (14 species) inhabit New Guinea and the surrounding islands, 4 species are found in Northern Australia (2 endemic). A further species has been described from Sulawesi recently (Stüning, 2005), but several undescribed species are still known to occurs (Sulawesi, Luzon, Mindanao). A striking feature of the species now included in Bracca is the diversity of wing pattern. Until Holloway (1991) united them in the present genus, they have been scattered over at least fifteen genera. Five of them, *Arycanda* Walker, 1856, *Cosmethis* Hübner [1820], *Duga* Walker [1865], *Panaethia* Guenée [1858] and *Tigridoptera* Herrich-Schäffer, 1855, Holloway (l.c.) proved to be junior subjective synonyms of *Bracca*, the other names were just applied erroneously to certain species, belonging even to different families like Arctiidae and Noctuidae.

Besides the variety of wing pattern on species level, some widespread species show a similar feature on subspecies level: this phenomenon of largely different island races has been found so explicit only in the genus *Bracca*. Four examples are discussed in detail:

B. maculosa Warren: the nominate subspecies, occurring in Sumatra, Borneo and Peninsular Malaysia has black pattern elements on a blue-grey ground colour, its subspecies *radiolata* Warren from Palawan has several dull orange, longitudinal streaks in addition and the black pattern elements are of different shape and arrangement (Fig. 1).

B. exul Herrich-Schäffer: the nominate subspecies, distributed in Java, also has black pattern elements on a blue-grey ground, several dull orange, longitudinal streaks and a broad distal area without any markings on both wings. Its subspecies *actinoides*

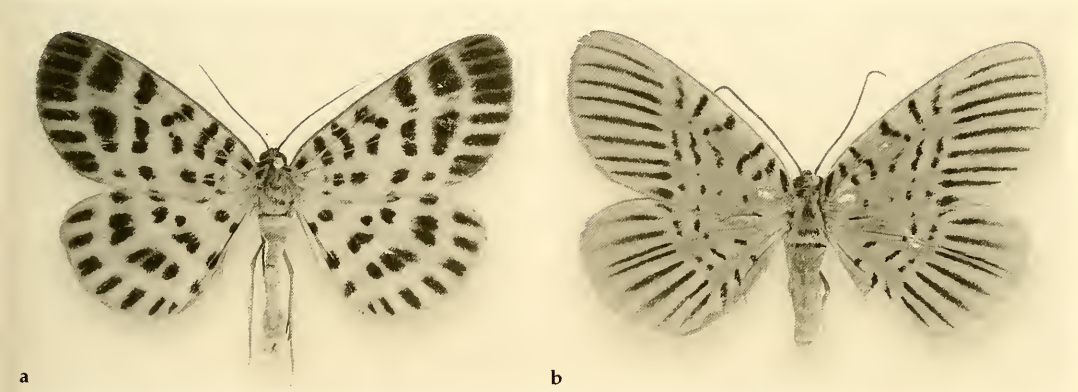

Fig. 1. *Bracca maculosa maculosa* Warren (**a**) and its subspecies *B. m. radiolata* Warren (**b**).

Sommerer & Stüning from Sumatra has this area extensively marked with longitudinal, black stripes and the number of dull orange stripes is reduced.

B. monochrias Meyrick, described from Sangihe Island, and its subspecies *cuneiplena* Swinhoe (Mindanao) and *benguetana* Schultze (Luzon) exhibit comparatively strong differences.

B. georgiata Guenée, with the nominate subspecies, found in Sumatra, Borneo, Peninsular Malaysia and Sulawesi, similar in pattern and coloration to *B. maculosa*, its race *pervasata* Walker from Java also with additional, dull orange streaks. The name *pervasata* is applied to several more or less different island races (Buru, Seram, several Philippine islands) at present which may deserve subspecies-rank as well. In Sulawesi, the nominate *georgiata* seems to occur sympatrically with its race *pervasata*, but studies of the genitalia structures have revealed that the *pervasata*-like form is specifically different. This phenomenon may be explained by subsequent arrival (of *georgiata*) after initial vicariance, as observed also in other groups of moths and butterflies.

The conspicuous pattern of adult *Bracca* moths and their larvae – the latter are strikingly coloured with red, black and white elements – may indicate that they are distasteful or toxic for predators. Consequently, mimicry phenomena are a possible explanation for the development of those strongly different island races, encountered in the genus *Bracca* so explicitely.

Diversity and Phenology of Geometridae in coastal Central Queensland

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Light trapping was carried out on 5 nights per week over 7 years at Rockhampton in Central Queensland, circa 40 km inland. Rockhampton lies close to the Tropic of Capricorn in an arid corridor between wetter regions, north to Mackay, and south-east Queensland. The December mean maximum temperature is 31.4 °C and the mean minimum for July is 22.9 °C. The mean number of rain days per year is 92. Good rain events are often associated with cyclones during the wet (hot or summer) season.

Most collecting was carried out during low to average rainfall periods, with 1983 having the highest rainfall and 1982 the lowest. The trap was a Robinson style trap located in the University grounds and was surrounded by Eucalyptus 'scrub' which is regrowth, possibly 40 years old at the time of trapping. The daily catch was identified and recorded using 'Rothampstead Weeks'. Seasons were allocated as follows: Summer, weeks 49-9; Autumn, weeks 9-21; Winter, weeks 22-34; Spring, weeks 35-48.

Trapping yielded 13,324 individuals and 123 species of Geometridae. Between 53 and 84 species were recorded each year. Ennominae accounted for 38 species; Sterrhinae, 23 species; Geometrinae, 35 species; Larentiinae, 10 species; Oenochrominae 17 species. Of the 10 most abundant species 2 were Ennominae, 4 Oenochrominae, 1 Geometrinae and 3 Sterrhinae. A species accumulation curve calculated using EstimateS (Colwell 2005) predicted a total fauna 136 geometrid species. There is a relationship between annual rainfall and the number of geometrid species present each year. However, using Ecosim (Gotelli and Entsminger 2001) to standardise the annual community to 1000 individuals shows there to be few significant differences between years. In wet years more species were collected because many species become more abundant and are therefore more likely to be collected.

Phenology of the species was assessed by pooling the annual counts on a weekly basis and some illustrative examples are presented. *Arhodia lasiocamparia* (Oenochrominae) is present throughout the year. *Oenochroma pallida* (Oenochrominae) is another relatively common species with probably 3 discreet generations in summer, autumn and spring but which is not present in winter (the dry season). *Cleora decisaria* (Ennominae) is present all year, but with ~85 % of occurrences in autumn and spring. *C. acaciaria* (?*illustraria*) also appears to be an autumn and spring species. *Pachyplocia griseata* (Ennominae) appears to be a summer, autumn, winter species. *Psilalcis isombra* (Ennominae) occurs predominantly in winter and spring. *Scopula innocens* (Sterrhinae) is a spring-summer-autumn species. *S. rubraria* is an autumn-winter-spring species with only 1 occurrence in 7 years in late summer. This species was first found in 1985 and then in subsequent years in increasing abundance as was the spring time species *Zermizinga sinuata* (Ennominae). *Mixocera latilineata*